

## Chapter 4

# What Is Critical Cartography and GIS?

*"Cartography is not what cartographers tell us it is."*

Brian Harley

Brian Harley's axiom quoted above that cartography is not what cartographers tell us it is can well serve to summarize some of the essential ideas behind critical cartography and GIS. Harley's life and contributions are examined in more depth later in this book (see Chapter 7), and his name is often invoked in the context of critical mapping. Calling things into question was a hallmark of Harley's life. One of his obituaries went so far as to title itself "questioning maps, questioning cartography, questioning cartographers" (Edney 1992). How can his work help us understand the impact of critical cartography?

I would suggest that a good definition of critical mapping is that it *calls things into question*. Among the most notable things to be questioned are the claims of the discipline of cartography to be a science, and to progress from the solution of one problem after another in what Arthur Robinson called "The Essential Cartographic Process" (Wood and Krygier 2009).

A related idea is that critical mapping (cartography and GIS) examines the relationship of knowledge with power. What are the underpinning assumptions that help to govern knowledge? That is, what rationalities are in play? The reason many critical mappers and critical geographers think this is important is because these rationalities shape and form the subject of the map, that is, how the map helps oppress, subjugate, or subjectify individuals and populations (Wood and Krygier 2009).

To look at the relationship of power and knowledge therefore is *not* to claim that "knowledge is power" or that might makes right. What it does say is that what we know is affected by relationships of power: some ways of knowing are deemed to be better than other ways of knowing, and therefore it is "easier" for us to know things in certain modes rather than others. Which ways? Well, it depends on what historical time period you're looking at. Today, the scientific mode of knowledge is predominant. For a critical mapper, the objective is not to over-turn this way of knowing (as some scientists often believe) but to ask how it has come to be so

powerful (perhaps as a historical investigation) and to ask what the implications are of this knowledge and whether or not alternative ways of knowing are possible. Because the latter question is sometimes framed as a critique of the limitations of scientific knowledge, or of its negative effects, some writers who identify with the scientific mode of knowledge have assumed that this kind of critique will usher in relativism. By this they claim that all ideas will become relatively acceptable; opening the flood-gates to non-scientific knowledge such as creationism, intelligent design, or worse, to the politicization of knowledge (e.g., to the denial of global climate change, or opposition to experimental stem cell research, etc.).

These disputes are long-standing and will not be resolved here. One point to bear in mind however is the understanding of critical researchers that knowledge can never come in an unpoliticized form, because as mentioned above they see knowledge as situated within relationships of power.

It is significant that the word "discipline" has more than one meaning. In addition to referring to a body of knowledge such as geography, it also means the practice of learning (a related word is "pupil") and from that idea keeping order and control – in other words, power. Such order and control is what critical mapping attempts to deconstruct – in what way is it ordered? For whose benefit? Is it possible to conceive of mappings that are outside the control of the prevailing discipline?

So there appears to be a basic contrast between critique, which tries to open things up, and disciplinary knowledge, which tries to anchor and tie down. As we shall see in the last chapter, this divergence of effort results in one of the basic tensions that currently occupy cartography and GIS.

## Undisciplining Mapping

In the last few years cartography has been slipping from the control of the powerful elites that have exercised dominance over it for several hundred years. You have probably already noticed this with the emergence of fantastically popular mapping applications such as Google Earth. The elites – the map experts, the great map houses of the West, national and local governments, the major mapping and GIS companies, and to a lesser extent academics – have been confronted by two important developments that threaten to undermine their dominance. First, as Google Earth has shown, the actual business of mapmaking, of collecting spatial data and mapping it out, is passing out of the hands of the experts. The ability to make a map, even a stunning interactive 3D map, is now available to anyone with a home computer and a broadband internet connection. Cartography's latest "technological transition" (Monmonier 1985; Perkins 2003) is not only a technological question but a mixture of "open source" collaborative tools, mobile mapping applications, and the geospatial web.

While this trend has been apparent to industry insiders for some time, a second challenge has also been issued. This is a social theoretic critique that is challenging

the way we have thought about mapping in the post-war era. During the last 50 years or so cartography and GIS have very much aspired to push maps as factual scientific documents. Critical cartography and GIS however conceives of mapping as embedded in specific *relations of power*. That is, mapping is involved in *what* we choose to represent, *how* we choose to represent objects such as people and things, and *what* decisions are made with those representations. In other words, mapping is in and of itself a political process. And it is a political process in which increasing numbers of people are participating. If the map is a specific set of power/knowledge claims, then not only the state and the elites but the rest of us too could make competing and equally powerful claims (Wood 1992).

This one-two punch – a pervasive set of imaginative mapping practices and a critique highlighting the politics of mapping – has “undisciplined” cartography. That is, these two trends challenge the established cartographic disciplinary methods and practices. It has certainly not occurred without opposition or resistance – which all new ideas encounter. For example, there is quite a strong trend in the USA and other countries right now to make people “qualify” as GIS experts through a licensing or certification process. Indeed an organization known as Management Association of Private Photogrammetric Surveyors (MAPPS) which represents licensed surveyors recently sued the US government in order to force it to hire only licensed users of geospatial information. This would have had large repercussions on federal contractors and further encouraged the development of “bodies of knowledge” that people must qualify in before they can use maps or GIS (such as this one: DiBiase et al. 2006). While MAPPS lost their lawsuit they issued a statement saying “the game is not over” (MAPPS 2007).

Critical mapping operates from the ground up in a diffuse manner without top-down control and doesn’t need the approval of experts in order to flourish. It is a movement that is ongoing whether or not the *academic* discipline of cartography is involved (D. Wood 2003). It is in this sense that cartography is being freed from the confines of the academy and opened up to the people.

This chapter discusses these two critical movements of cartography. I will begin by elaborating on the idea that critique is political by its nature, which will sustain the view offered throughout this book that mapping is a political activity in and of itself. Second I will examine the idea that today’s critical cartography and GIS, although it is often thought of as arising in the late 1980s associated with the work of Harley, Pickles, Wood, and others, is actually part of a longer-standing cartographic critique. Throughout its history mapping has been continually contested. Its history is not one in which it progressed from one stage to another as it became a science (an idea often implied in the textbooks). In fact, cartography as a way of knowing the world has constantly struggled with the status of that knowledge in a “contested tradition” similar to that of the geographical discipline more widely (Livingstone 1992a). As Brian Harley pointed out in his seminal article that helped launch the modern field of critical cartography, cartography is not merely to “what *cartographers* tell us maps are supposed to be” (Harley 1989a: 1).

## **What Is a Map? Why We Can't Define It and Why It Doesn't Matter**

If cartography is not what cartographers tell us maps are supposed to be, then just what is a map? A typical official definition of the map is that "it is a graphic representation of space" (International Cartographic Association, ICA). That definition is fine as far as it goes, but it tells us little about the way maps are used.

If critique examines the assumptions of a field of knowledge, as we saw in the previous chapter, then it would seem that a fundamental critique of mapping is to carefully examine this definition.

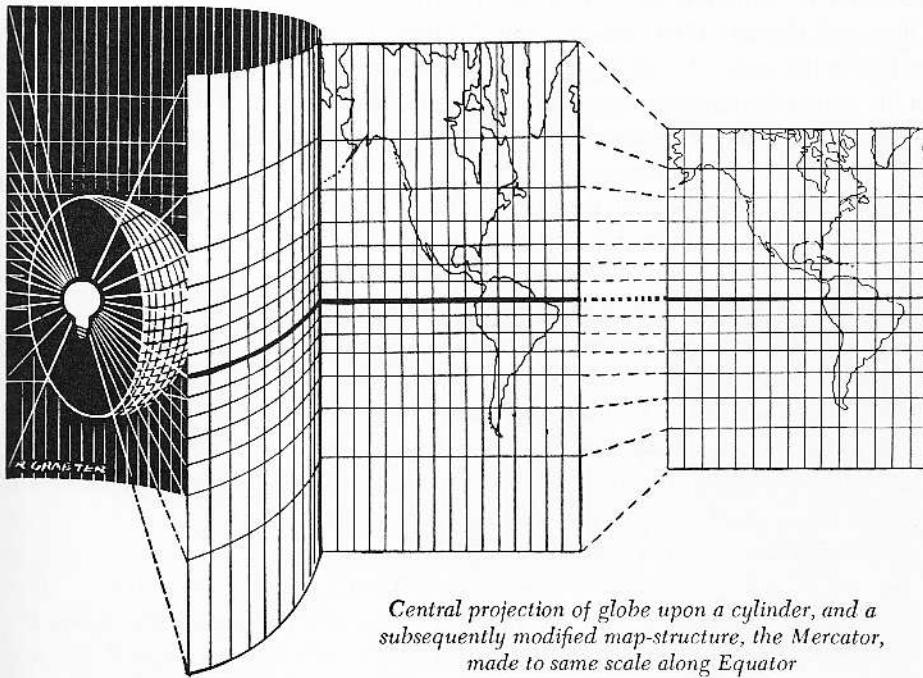
For instance, is the concept of the map one which is invariant across cultures, age, sex, etc.? In a simple experiment that Roger Downs performed in his introductory human geography class, he was able to show some very interesting things about maps. Downs showed a number of images to his class (say 40 different pictures), composed of images taken from geography textbooks, aerial photographs, historic maps, and so on. For each image, you had to respond "yes it is a map," "no it is not a map," or "? Don't know."

Each person viewing the image made a personal assessment as to whether it was a map or not. The results showed the following:

1. in a given group, some images were almost always seen as maps, some were almost always not seen as maps, and some images were sometimes seen as maps;
2. the degree to which people agreed that an image was a map increased with age.

The first finding shows importantly that people have a core idea of what a map is (typically the kind of small-scale or global map found in textbooks). These are the maps that come to mind when someone talks about mapping or GIS. There are also a number of images that are almost universally rejected as maps (such as aerial photographs and often historical maps). So in any given group there is a lot of agreement on what constitutes a map and what doesn't and this covers most of the images. However, there is also a small number of images for which there is no agreement, neither being rated consistently as maps or not as maps by the group.

This second finding strongly indicates that our understanding of maps is a learned response, because as we gain more experience with the wide variety of mapping forms we are more willing to see them as maps. Children have a very narrow conception of what a map is, due to their narrower experience and understanding of symbolic representation. And while children begin remarkably early on to get a sense of how maps work, this sense remains subject to confusion and is incomplete for many years. For example, children often mix up scale (claiming to see the coach on the dugout of an aerial photograph of a baseball diamond), or are unable to separate the map symbol from its real life object (thinking that the road must be red because it is colored red on the map). As we get older the concept of the map correspondingly expands, although skill with mapping varies individually (Downs 1994; Liben and Downs 1989).



**Figure 4.1** The shadow metaphor explanation of projections. Source: Greenwood (1964). © 1964 by the University of Chicago. Used with permission.

Even some skills we might expect to have attained by adulthood, however, remain elusive for most of us. Let's take an everyday example. One of the common ways to explain how a projection works is to ask the reader to imagine that there is a strong light source at the center of the earth. This source then "projects" a shadow in the shape of the landmasses on a container surrounding the earth (a cylinder for example). This explanation was once quite popular in cartography textbooks as Figure 4.1 shows.

However, when our actual understanding of shadows is tested we do quite poorly. Downs and Liben (1991) asked subjects (adult college students) to draw the shadow that would be cast by simple objects such as circles and squares. For example, if you cut a square out of a piece of cardboard and hold it between a screen and a light source, what would the shadow look like? What would it look like if you tilted the square? The results are startling; overall only about 50 percent of the shapes were drawn correctly, and this despite the fact that we encounter shadows on a daily basis in our lives. When the shape was held straight up, that is, at 90 degrees to the light source, the correct shadow was guessed more frequently, but when the shape was turned obliquely performance declined rapidly. Objects with thicker edges were almost never correctly drawn. The researchers also found that females did significantly more poorly than males.

If we want to answer the question of what is a map then we must begin by acknowledging that it is a culturally learned knowledge. Not only that but the skills



necessary to comprehend them are learned through a *struggle* for understanding. Liben and Downs (1989) use the word “realize” to capture this sense of struggle; realize in the sense of making real, that is maps realize the world, and also realize in the sense of gaining an understanding (“Ah! Now I realize.”). They contrast their position that maps are “opaque” in these senses of realizing to the commonly accepted one that maps are “transparent,” that is that we see through maps to the underlying landscape (Downs and Liben 1988), or that it is possible to learn mapping early and easily. We can extend this argument to GIS: do we see “through” a GIS to the underlying reality (Downs 1997)? No, rather the GIS is a process of making a world (creating knowledge) not a mirror or window: “maps are creative statements about the world, not merely degraded reflections of it” (Liben and Downs 1989: 148). As the Iranian poet and mystic Rumi says: “speak a new language, so that the world will be a new world.” This observation marks a key idea in this book.

So although people have a strong idea of a typical map (the “core” map concept) the kinds of maps that comprise this core are not culturally invariant, as we can quickly see if we look at maps outside the Western tradition. Figure 4.2 shows a native American map and a Pre-Conquest Mixtec map.

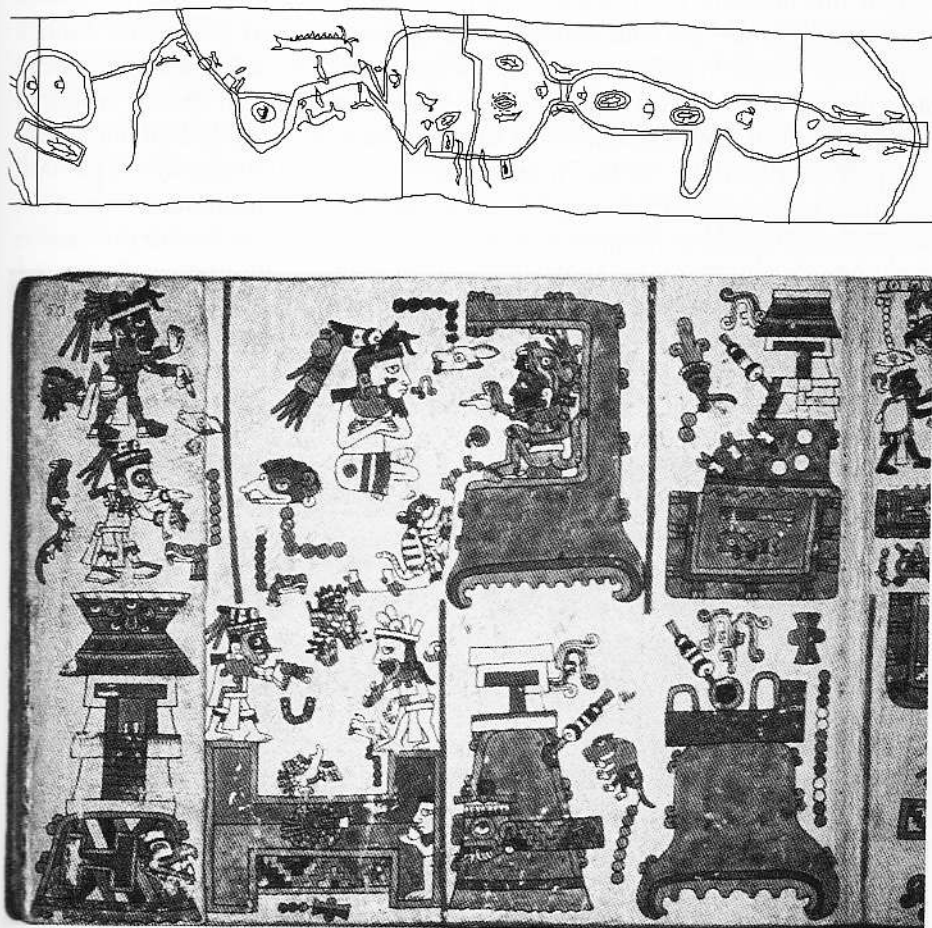
Speaking of maps such as the Nuttall Screenfold, Harley observes that it “does not look like a map to twentieth-century eyes. Yet as a picture history telling the story of an early conqueror of Southern Mexico it is fixed in space as much as time. When we crack the code it reveals elements that are map-like in purpose and content” (Harley 1990b: 29).

The conception of a map varies significantly between different cultural groups. The map test also found a large number of images that are often but not always understood as maps, perhaps depending on the context. The degree to which these map-like objects are rated as maps increases as people become more familiar with them. Maps appear to exist on a sliding scale of “mappiness,” varying from extremely mappy to only slightly mappy. There is however no single essential “look of maps” – this is why people have struggled with an all-encompassing definition and why it is more productive not to try (Vasiliev et al. 1990). They can and have appeared on bark, animal skins, papyrus, linen, paper, clay, wood, sand, rock, computer screens, napkins, and backs of envelopes, to name a few physical media. This does not include mental maps nor maps that only exist as performances (for example a policeman gesturing a route or an artistic performance of a map – see Chapter 12).

Maps then are part of the cultural knowledge that we acquire by being immersed in a society. Both our expectations *about* maps (what they should look like, how to use them) and the play of knowledge that they *produce* are deeply related to the shape of that culture and its contours of power.

## The Production of Space

Consider the word “representation” in the ICA definition. Critical cartography and GIS question what is meant by “representation,” a question that has also often popped



**Figure 4.2** Ojibwe (Native American) map, c. 1820, detail (top) and Nuttall Screenfold Pre-Conquest Mixtec map (bottom). Source: Ojibwe map drawn by John Krygier, used with permission. Nuttall Screenfold © Trustees of the British Museum, used with permission.

up in philosophy (Rorty 1979) and cultural studies, as well as geography (Thrift 2006). This is because “representation” naturally enough appears to imply that something already exists prior to the act of mapping (the space or landscape being mapped). There is a landscape out there, and it is captured in some “representative” way by the map. Even if we agree that the landscape is not the map, maps have to creatively leave out details as Monmonier has written: “not only is it easy to lie with maps, it’s essential” (Monmonier 1991: 1). But still, the landscape comes first, and like a painting or photograph we “take” essential elements of it for our representation.

Critical cartographers (as well as cognitive developmentalists such as Roger Downs and Lynn Liben cited above), on the other hand, argue that mapping creates specific spatial knowledges and meanings by identifying, naming, categorizing, excluding, and ordering. The ICA definition of the map as a graphic representation does not

exclude this meaning, but it doesn't really emphasize it either. Furthermore, once these categories are put into play they can be used to exert power and control people and things. Mapping creates knowledge as much as (and for some, instead of) reflecting it. Critical cartographers do not argue that *physical* space is produced by the process of mapping, but rather that new ways of thinking about and treating space are produced. "Space," in this account, is not just a question of physical and material disposition (although it is that) but also the constitution of objects. For critical cartography, mapping is not just a reflection of reality, but the production of knowledge, and therefore, truth.

For example, when Christopher Columbus struck land on October 12, 1492, he carried with him (or had seen) a map or globe much like the one reproduced in Figure 4.3, which shows a facsimile of the Behaim Globe.



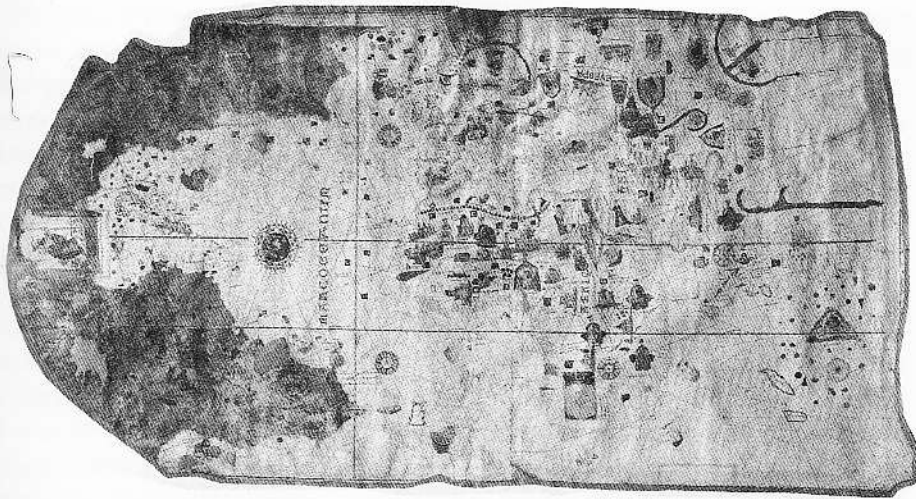
**Figure 4.3** The Martin Behaim Globe (1492). From the American Geographical Society Library, University of Wisconsin-Milwaukee Libraries.



Columbus of course was unaware of the American continent, but contrary to popular mythology he knew the world was round. He drew on the work of ancient geographical writing by Aristotle and Ptolemy who themselves had tried to estimate the size of the globe, and had mapped the known portions of it. Columbus's plan was to sail westwards to India and China to establish a new trade route but also to convert the inhabitants to Catholicism for King Ferdinand and Queen Isabella (who were financing his trip). He named his journey the "Enterprise of the Indies" and attached to it all sorts of titles and land bequests for himself and his family. As Harley has shown (1992b), he renamed with Christianized names the islands and places already named by the indigenous Sarawak Indians. So the place where he made landfall became "San Salvador" (the Savior), other islands became Santa Maria de la Concepcion (holy conception), Trinidad (holy trinity), etc. Even his ship was called the *Santa Maria* (Virgin Mary) and he signed himself "Christoferens" or "Christ-bearer." In fact he succeeded so well in renaming places that only one original name is known, the island of Guanahani (an island in the Bahamas). Columbus's cartographer, Juan de la Cosa, made an interesting map of these discoveries, placing the new, religious names on the map (Figure 4.4).

By reinscribing new identities on these places then, and specifically with Western Christian names, Columbus effectively created a new space that was compliant with Western beliefs, and which permitted it to be governed and controlled. As Harley observed:

The purpose of [the Juan de la Cosa] map is clearly signposted as an instrument of European empire. National flags – both Spanish and English – are planted to claim ownership of the new territories. The map also proclaims a crusade. A compass rose astride the equator portrays the Holy Family. The figure of St. Christopher is said



**Figure 4.4** Juan de la Cosa's map of the world, c. 1500. Columbus' discoveries are indicated on the left-hand side.

to be an allusion to Columbus carrying the Christ child on his shoulders. As "Christoferens," he is the bearer of Christianity across the ocean to the pagan shores of the New World.

Placenames commemorate the famous shrines of the Virgin in Castile, Catalonia, and Italy. Placed thus on the new land they become emblems of possession. Columbus tells us in his Journal for Friday, 16th November 1492: "in every place I have entered, islands and lands, I have always planted a cross." The names on the map are the written record of these innumerable acts of territorial consecration, some of them witnessed by Juan de la Cosa. (Harley 1990b: 61)

This is a classic episode in the history of cartography and colonialism. It demonstrates that maps make space as much as they record space. This is quite literally "map or be mapped" (Bryan 2009; Stone 1998). As Bernard Nietschmann once pointed out "more indigenous territory has been claimed by maps than by guns," but as we will see in more detail in Chapter 9, the corollary of this is that "more indigenous territory can be reclaimed by maps than by guns" (Nietschmann 1995: 37).

In the next chapter, we will delve further into this assertion that mapping became scientific during the second half of the twentieth century. On what basis is this claim made? Why is it made? In subsequent chapters we shall expand the scope of what mapping does, specifically we shall see how maps are involved in governance, in geosurveillance, and in the construction of race and identity.